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Advent/Maxim
The Advent Building
17838 Burke Street
Suite 200
Omaha, NE 68118

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAVID SKURNIK, NEVZAT A. KESTELLI, ILYA K. VEYGMAN, ANAND CHAMAKURA, CHRISTOPHER F. EDWARDS, NICOLE D. KERNESS, PIROOZ PARVARANDEH, SUNNY K. HSU, JUDY LAU, RONALD B. KOO, DANIEL S. CHRISTMAN, and RICHARD I. OLSEN

Appeal 2016-002557
Application 14/048,219
Technology Center 2800

Before ADRIENE LEPIANE HANLON, CATHERINE Q. TIMM, and JAMES C. HOUSEL, *Administrative Patent Judges*.

PER CURIAM.

DECISION ON APPEAL[1]

STATEMENT OF THE CASE

Appellants[2] filed an appeal under 35 U.S.C. § 134(a) from the

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[1] Our decision refers to Appellants' Specification filed Sept. 3, 2014 (Spec.), the Final Office Action (Final Act.) mailed Mar. 13, 2015, Appellants' Appeal Brief filed July 27, 2015 (Appeal Br.), the Examiner's Answer mailed Oct. 22, 2015 (Ans.), and Appellants' Reply Brief (Reply Br.) filed Dec. 22, 2015.

[2] Appellants identify the real party in interest as Maxim Integrated Products, Inc. Appeal Br. 3.

Examiner's decision finally rejecting claims 1–5, 10–15, and 20, which constitute all the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

The claims on appeal are directed to gesture sensing devices (*see, e.g.*, claims 1, 11, and 20). Appellants disclose that electronic devices, such as smart phones, tablets, laptop and desktop computers, and digital media players, increasingly use light sensors during the manipulation of functions of the devices. Spec. ¶ 2. For instance, light sensing devices are commonly used as gesture or proximity sensing devices that enable detection of physical movement largely parallel to a display surface, or perpendicular to the display surface, without a user touching the device. Spec. ¶ 3. These light sensing devices can be used to recognize distinct non-contact hand motions, such as left-to-right, right-to-left, up-to-down, down-to-up, in-to-out, out-to-in, and other motions. Spec. ¶ 3.

Appellants disclose that conventional devices may use three or more illumination sources and a light sensor to detect light reflected from a moving object. Spec. ¶ 36. Such configurations can be disadvantageous because it is difficult to reduce the size of the device. Spec. ¶ 41. In view of this, Appellants disclose gesture sensing devices using a single illumination source. Spec. ¶ 42. The gesture sensing devices further include a light modifying structure, such as a mechanical structure configured to selectively block a portion of light depending upon a position of a target object relative to a light sensor. Spec. ¶ 43. The mechanical structure may be a wall structure including a plurality of metal layers and vias, which may be arranged in a stair step configuration. Spec. ¶¶ 43 and 83. The stair step

configuration is depicted in Figure 17, an annotated copy of which is reproduced below.

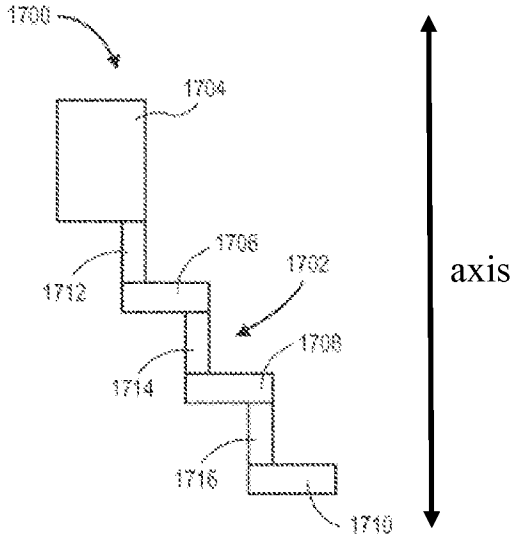

FIG. 17

Figure 17 depicts a side view of a light modifying structure

The mechanical structure 1700 shown in Figure 17 forms a wall structure 1702 at a non-perpendicular angle with respect to a photodiode cell (not shown). Spec. ¶ 83. The wall structure 1702 includes metal layers 1704, 1706, 1708, 1710 and vias 1712, 1714, 1716. Spec. ¶ 83. As a result, metal layers 1704, 1706, 1708, 1710 are offset by different distances from the axis shown in the annotated copy of Figure 17 above.

Independent claim 1 is illustrative of the subject matter on appeal. Claim 1 is reproduced from the Claims Appendix of the Supplemental Appeal Brief with the limitations Appellants highlight (Appeal Br. 16)

italicized and reference numerals from Figure 17 added for further illustration:

1. A gesture sensing device comprising:

a single illumination source configured to emit light;

a light sensor assembly comprising a plurality of photodetectors configured to detect the light reflected from an object and to output time dependent signals in response thereto;

a processing circuit coupled to the light sensor assembly and configured to analyze the time dependent signals received from the light sensor assembly and to determine object directional movement proximate to the light sensor assembly; and

a light modifying wall structure [e.g., 1700 in Fig. 17] disposed adjacent to the light sensor assembly, the light modifying wall structure [1700] configured to selectively block a portion of the light reflected from the object depending on a position of the object relative to the light sensor assembly,

the light modifying wall structure [1700] comprising a plurality of layers [e.g., 1706, 1708, 1710] and a plurality of vias [e.g., 1714, 1716], respective ones of the plurality of layers and the plurality of vias offset with respect to a center axis defined perpendicular to a surface of the light sensor assembly,

wherein a first offset distance from an optical axis of one of the plurality of photodetectors to a first one of the plurality of layers [1710] is less than a second offset distance from the optical axis to a second one of the plurality of layers [1708], *wherein the second offset distance from the optical axis of one of the plurality of photodetectors to the second one of the plurality of layers [1708] is less than a third offset distance from the optical*

> *axis to a third one of the plurality of layers [1706]*, the second one of the plurality of layers [1708] being disposed above the first one of the plurality of layers [1710] with respect to the light sensor assembly, *the third one of the plurality of layers [1706] being disposed above the second one of the plurality of layers [1708] with respect to the light sensor assembly.*

Appeal Br. 27 (emphasis and formatting added).

The claims on appeal stand rejected as follows:

(1) claims 1–5, 10, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Zhang[3] in view of Tseng;[4]

(2) claims 11–15 under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Rudd[5] and Tseng; and

(3) claims 1–5, 10–15, and 20 under the ground of nonstatutory double patenting as being unpatentable over claims 1–5 and 13 of US 8,716,659 in view of Tseng.

OPINION

Rejection of claims 1–5, 10, and 20 over Zhang and Tseng

Claims 1–5, 10, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Tseng. Appellants argue claims 1–5 and 10 as a group and claim 20 separately. Appeal Br. 14–18 and 22–25. We select claims 1 and 20 as representative for discussing the issues on appeal.

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[3] Zhang, US 8,187,097 B1, issued May 29, 2012 ("Zhang").
[4] Tseng et al., US 2010/0320552 A1, published Dec. 23, 2010 ("Tseng").
[5] Rudd et al., US 6,288,786 B1, issued Sept. 11, 2001 ("Rudd").

The Examiner finds Zhang discloses a gesture sensing device including a single illumination source, a light sensor assembly, a processing circuit, and a light modifying wall structure configured to selectively block a portion of light reflected from an object depending on a position of the object relative to the light sensor assembly. Final Act. 10. The Examiner finds Zhang does not disclose a light modifying wall structure including a plurality of layers and vias in the arrangement recited in claim 1. Final Act. 10–11.

The Examiner finds Tseng discloses a sensing device including a light modifying wall structure, citing Figure 2 of Tseng. Figure 2 is reproduced below, including annotations to show first, second, and third metal layers and an exemplary axis.

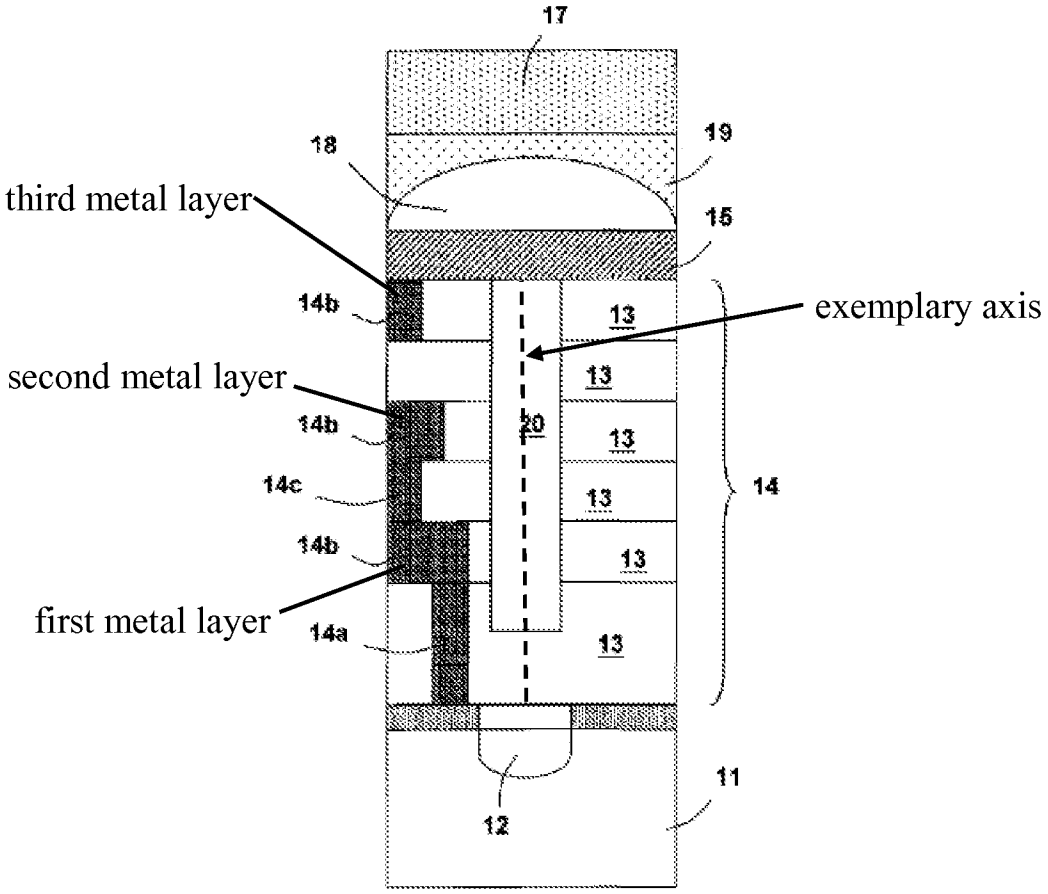

Fig. 2

Figure 2 depicts an embodiment of a complementary metal-oxide semiconductor image sensor

The complementary metal-oxide semiconductor (CMOS) image sensor shown in Figure 2 includes a substrate 11, a photo diode 12, and an interconnection 14 formed by a contact plug 14a, metal lines 14b, and a via plug 14c insulated from one another by dielectric material 13. Tseng ¶ 14. The sensor further includes a light passage 20, a passivation layer 15, a micro lens 18, a planarization layer 19, and a color filter 17. Tseng ¶¶ 14, 15.

The Examiner finds the metal lines 14b depicted in Figure 2 function as a plurality of layers and the contact plug 14a and via plug 14c function as a plurality of vias offset with respect to a center axis defined perpendicularly to a surface of the photo diode 12 (e.g., the exemplary axis in the annotated copy of Figure 2 above). Final Act. 11. The Examiner further finds the metal lines 14b include the first offset distance recited in claim 1, the second metal layer is disposed above the first metal layer, and the third metal layer is disposed above the second metal layer. Final Act. 11.

The Examiner concludes it would have been obvious to modify Zhang to include the wall structure of Tseng. Final Act. 11. However, the Examiner finds Zhang, as modified by Tseng, does not provide "a clear disclosure of the second offset distance from the optical axis of one of the plurality of photodetectors to the second one of the plurality of layers is less than a third offset distance from the optical axis to a third one of the plurality of layers," as recited in claim 1. Final Act. 11. To address this, the Examiner finds "an optimal offset in order to optimize light detection is a design choice" and concludes it would have been obvious to provide the claimed second offset distance in the combination of Zhang and Tseng. Final Act. 11–12.

Appellants contend that the offset distances are not a mere design choice because the function of the claimed light modifying wall structure is different from the function of the interconnection 14 in Tseng, which is an electrical connection. Appeal Br. 17–18 and Reply Br. 5–7. Because of this, Appellant argues the combination of Zhang and Tseng does not disclose or suggest all of the limitations of claim 1. Appeal Br. 17.

We understand the Examiner's position to be that there is no "clear disclosure" in Tseng of the second offset distance recited in claim 1. Final Act. 11. In other words, the Examiner finds no express teaching of the second offset distance in the disclosure of Tseng. The Examiner emphasizes this in the Examiner's Answer by stating "Zhang and Tseng et al. lack a *clear* disclosure of the second offset distance from the optical axis of one of the plurality of photodetectors to the second one of the plurality of layers is less than a third offset distance from the optical axis to a third one of the plurality of layers." Ans. 4.

A preponderance of the evidence supports the Examiner's finding that Zhang would have suggested the offset distances of the claim. Although the written description within the specification of Tseng does not provide an express disclosure of the second offset distance recited in claim 1, Figure 2 suggests such a structure. While the measurements of features in a drawing have little value when a reference does not disclose drawings as drawn to scale,[6] drawings may evaluated for what they reasonably disclose and suggest to one of ordinary skill in the art. *In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979).

The Examiner finds the metal lines 14b depicted in Figure 2 function as a plurality of layers. Final Act. 11. Figure 2 suggests the first offset distance recited in claim 1 because, as shown in the annotated copy of Figure 2 above, a first metal layer is offset less from the exemplary axis (which may serve as an optical axis for the photo diode 12 in Figure 2) than a second metal layer above it. In particular, there is a greater distance

[6] *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000).

between the right edge of the second metal layer and the exemplary axis than between the right edge of the first metal layer and the exemplary axis.

Moreover, Figure 2 suggests the second offset distance of claim 1. Specifically, there is a greater distance between the right edge of the third metal layer and the exemplary axis than between the right edge of the second metal layer and the exemplary axis. Figure 2 suggests the second offset distance due to the positions of the metals layers depicted in Figure 2 in relation to one another and the axis. Thus, although Tseng does not expressly disclose the second offset distance of claim 1, Figure 2 would have suggested the second offset distance to one of ordinary skill in the art.

Citing the Examiner's remarks in the Answer, Appellants further argue the Examiner mischaracterized Tseng as disclosing a light modifying wall structure "configured to selectively block a portion of the light reflected from the object depending on a position of the object relative to the light sensor assembly," as recited in claim 1. Reply Br. 4–5.

In order to properly consider the import of the recitation "configured to selectively block a portion of the light reflected from the object depending on a position of the object relative to the light sensor assembly" it must be remembered that, although in common parlance, the phrase "configured to" implies an intent of a designer, this intent cannot play a role in limiting the structure of the claim. *See Roberts v. Ryer*, 91 U.S. 150, 157, 23 L.Ed. 267 (1875) ("The inventor of a machine is entitled to the benefit of all the uses to which it can be put, no matter whether he had conceived the idea of the use or not."); *In re Michlin*, 256 F.2d 317, 320 (CCPA 1958) (patentability of the structure cannot turn on its use or function). Thus, whether Tseng intended to configure the wall structure (14a, 14b, 14c) "to selectively block

a portion of the light reflected from the object depending on a position of the object relative to the light sensor assembly" is of no matter; we must consider how the language patentably differentiates the claimed structure from the prior art structure. We do not find such a patentable structural distinction. As correctly pointed out by Appellants, Tseng teaches a CMOS image sensor in which

> several layers of interconnection 14 are formed above the photo diode 12, including a contact plug 14*a,* metal lines 14*b,* a via plug 14*c,* etc., wherein these portions of interconnection are insulated from one another by a dielectric material 13. After completion of the interconnection 14**,** preferably, a light passage 20 is formed by etching.

Reply Br. 4–5 (quoting Tseng ¶ 14). Tseng discloses "it is preferable to provide a light passage 20 in the dielectric material 13 such that more light reaches the photo diode 12 through the dielectric material 13." Tseng ¶ 3 (bolding omitted). In other words, light passage 20 is optional, and light travels through the dielectric material 13. A preponderance of the evidence indicates that, given the similarity in structure of the interconnect 14 to Appellants' light modifying wall and the light-transmissive nature of the dielectric material 13, the interconnection 14 would function to selectively block a portion of the light in the manner recited in the functional portion of the "configured to" clause recited in claim 1. A preponderance of the evidence supports the Examiner's finding that the "configured to" clause does not patentably distinguish Appellants claimed light modifying wall structure from the wall structure (interconnection 14) of Tseng.

Appellants do not argue claims 2–5 and 10 separately from claim 1. Appeal Br. 18. Therefore, we sustain the § 103 rejection of claims 1–5 and 10 over Zhang in view of Tseng.

Independent claim 20 recites structures similar to those of claim 1, including a single illumination source, a light sensor, and a light modifying wall structure having a structure similar to the light modifying wall structure of claim 1. Appeal Br. 30. For the rejection of claim 20 over Zhang and Tseng, Appellants set forth arguments similar to those made in the rejection of claim 1. Appeal Br. 22–25 and Reply Br. 11–15. As discussed above, these arguments do not fully address the Examiner's rejection or demonstrate a reversible error.

For the reasons discussed above and those set forth in the Examiner's Answer, we sustain the Examiner's § 103 rejection of claims 1–5, 10, and 20 over Zhang in view of Tseng.

Rejection of claims 11–15 over Zhang, Rudd, and Tseng

Claims 11–15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang in view of Rudd and Tseng.

With regard to Zhang and Tseng, the Examiner makes similar findings as in the rejection of claim 1. *Compare* Final Act. 10–15 *with* Final Act. 15–18. In the rejection of independent claim 11, the Examiner finds Zhang does not provide a clear disclosure of, among other things, an optical lens structure configured to at least partially collimate light and oriented at an angle with respect to an axis perpendicular to a surface of an electronic device. Final Act. 15–16. The Examiner finds Rudd discloses an optical lens structure configured to at least partially collimate light and angled with respect to an axis perpendicular to a surface of an electronic device and concludes it would have been obvious to modify Zhang in view of Rudd. Final Act. 16–17.

For claim 11, Appellants set forth similar arguments discussed above for the rejection of claims 1 and 20 regarding the Examiner's use of design choice. Appeal Br. 18–21 and Reply Br. 7–11. For the reasons discussed above and those set forth in the Examiner's Answer, these arguments do not demonstrate a reversible error. Appellants do not argue claims 12–15 separately from claim 11. Appeal Br. 22.

Therefore, we sustain the Examiner's § 103 rejection of claims 11–15 over Zhang in view of Rudd and Tseng.

Double patenting rejection of claims 1–5, 10–15, and 20

Claims 1–5, 10–15, and 20 are rejected under the ground of non-statutory double patenting as being unpatentable over claims 1–5 and 13 of US 8,716,659 in view of Tseng.

Appellants acknowledge the non-statutory obviousness-type double patenting rejection and request the rejection be held in abeyance, stating Appellants are ready to submit a terminal disclaimer upon resolution of the § 103 rejections. Appeal Br. 11. No arguments regarding the propriety of the rejection have been proffered by Appellants. We, therefore, summarily affirm the Examiner's non-statutory obviousness-type double patenting rejection of claims 1–5, 10–15, and 20.

DECISION

On the record before us, we affirm the decision of the Examiner to reject the claims.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED